INVENTION--.

At page 17, delete lines 4-25 (and insert the deleted text at page 5, between lines 20 and 21).

In the Claims

Please cancel, without prejudice, claims 9 and 11.

Please amend the remaining claims by substituting in their place, the following replacement claims:

1. (Amended)   Method for operating a multi-phase process that is chemical, physical, or both, in a vessel containing at least two phases, each phase being a liquid, a gas or solid particles, inside which vessel a fluid is distributed through a hierarchical network of channels comprising parent and child generations of channel formations, wherein substantially each channel in a parent generation is divided into N channels of a child generation, whereby each channel of said child generation may in turn be a parent for channels in a successive child generation, which network terminates in channel exits, such that said fluid is discharged from the channel exits substantially uniformly throughout the vessel volume.

2. (Amended)   Method according to claim 1 in which said network is a self-affine network of channels, wherein each of the channels in the parent generation has a diameter d_j and a length l_j, and each of the channels in the child generation has a diameter d_{j+1} and a length l_{j+1}, wherein at least one of the ratios d_j/d_{j+1} and l_j/l_{j+1} is substantially constant for channels of successive generations running in parallel direction.

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3. (Amended)   Method according to claim 2 wherein the diameters or_the lengths of channels in successive generations of said network, or both, are related to N by at least one of the following relationships:

$$N = (d_j/d_{j+1})^{\Delta}, \text{ and}$$

$$N = (l_j/l_{j+1})^{D},$$

wherein Δ and D each represents an integer or a real positive number.

4. (Amended)   Method for operating a process that is chemical, physical, or both, in a vessel containing at least two phases, each phase being a liquid, a gas, or solid particles, throughout which vessel a fluid is distributed through a hierarchical network of channels comprising parent and child generations of channel formations, wherein substantially each channel in a parent generation is divided into N channels of the child generation, whereby each channel of said child generation may in turn be a parent for channels in a successive child generation, which network terminates in channel exits, such that said fluid is discharged from the channel exits substantially uniformly throughout the vessel volume, wherein said network is a self-affine network of channels, wherein each of the channels in the parent generation has a diameter d_j and a length l_j, and each of the channels in the child generation has a diameter d_{j+1} and a length l_{j+1}, wherein at least one of the ratios d_j/d_{j+1} and l_j/l_{j+1} is substantially constant for channels of successive generations running in parallel direction, wherein the ratio of lengths of channels in successive generations of said network is related to N by the formula, $N = (l_j/l_{j+1})^{D}$, wherein D is between 2 and 3.

5. (Amended)   Method according to claim 1, in which said multi-phase process is selected from a group consisting of a

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fluidized bed process, a slurry process, an absorption process, a gas/liquid bubble column process, and an aeration process.

6. (Amended)   Method for scaling up a multi-phase process that is chemical, physical, or both, and that is carried out in a vessel, comprising the steps of:

building a small scale vessel;

distributing a fluid through a hierarchical network of channels comprising parent and child generations of channel formations, wherein substantially each channel in a parent generation is divided into about N channels of the child generation, wherein each of the channels in the parent generation has a diameter d_j and a length l_j and each of the channels in a child generation has a diameter d_{j+1} and a length l_{j+1}, which network terminates in channel exits, such that said fluid is discharged from the channel exits substantially uniformly throughout the vessel volume;

determining optimal geometry and optimal values for the parameters, N, Δ and D, wherein the diameters or the lengths of channels in successive generations of said network, or both, are related to N by at least one of the following relationships: $N = (d_j/d_{j+1})^\Delta$ and $N = (l_j/l_{j+1})^D$, wherein Δ and D each represents an integer or a real positive number; and

subsequently building a large scale vessel having substantially the same geometry and parameters as the small scale vessel, and having a larger number of generations than the small scale vessel.

7. (Amended)   Vessel containing, inside, a hierarchical network of channels, said network comprising parent and child generations of channel formations, wherein substantially each channel in a parent generation is divided into N channels of

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the child generation, whereby each channel of said child
generation may in turn be a parent for channels in a
successive child generation, which network terminates in
channel exits, wherein said network is a self-affine network
of channels, wherein each of the channels in the parent
generation has a diameter d_j and a length l_j, and each of the
channels in the child generation has a diameter d_{j+1} and a
length l_{j+1}, wherein at least one of the ratio d_j/d_{j+1} and the
ratio l_j/l_{j+1} is substantially constant for channels of
successive generations running in parallel direction, wherein
the ratio of lengths of channels in successive generations of
said network is related to N by $N = (l_j/l_{j+1})^D$, wherein D is a
real number between 2 and 3, which network terminates in
channel exits, such that fluid introduced into said network
and exiting said channel exits, is distributed substantially
uniformly throughout the vessel volume.

8. (Amended)   Vessel according to claim 7, wherein the ratio
of diameters of channels in successive generations of said
network is related to N by $N = (d_j/d_{j+1})^\Delta$,

wherein Δ represents an integer or a real positive
number.

10. (Amended) Hierarchical network of channels comprising
parent and child generations of channel formations, wherein
substantially each channel in a parent generation is divided
into N channels of the child generation, whereby each channel
of said child generation may in turn be a parent for channels
of a successive child generation, which network terminates in
channel exits, which said network is a self-affine network of
channels, wherein each of the channels in the parent
generation has a diameter d_j and length l_j and each of the
channels in the child generation has a diameter d_{j+1} and length
l_{j+1}, wherein at least one of the ratios d_j/d_{j+1} and l_j/l_{j+1} is
substantially constant for channels of successive generations

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running in parallel direction, wherein the ratios of diameters
[and/]or lengths of channels in successive generations of said
network are related to N by at least one of the following
formulas:

$$N = (d_j/d_{j+1})^{\Delta}, \text{ and}$$

$$N = (l_j/l_{j+1})^{D},$$

wherein Δ represents an integer or a real positive number and
wherein D is a real number between 2 and 3.

12. (Amended) Network according to claim 10 wherein at least
one material is present near the exits of said network or as a
coating on at least part of the inner surface of said network
or both, which material is capable of chemical or physical
interactions, or both, with fluids passing by the material.

13.   Network according to claim 10 which is provided with
means for obtaining a gradient in the dimensions of the
respective exits.

Please add the following new claims:

14.   (NEW)   Method according to claim 4, wherein the ratio
of diameters of channels in successive generations of said
network is related to N by the formula, $N = (d_j/d_{j+1})^{\Delta}$, wherein
Δ represents an integer or a real positive number.

15.   (NEW)   Method according to claim 4, wherein said self-
affine network is a self-similar network in which the ratios
d_j/d_{j+1} and l_j/l_{j+1} are both substantially constant for channels
of successive generations, independent of their direction.

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16. (NEW)   Method according to claim 2, wherein said self-affine network is a self-similar network, in which the ratios d_j/d_{j+1} and l_j/l_{j+1} are both substantially constant for channels of successive generations independent of their direction.

17. (NEW)   A vessel according to claim 7, wherein said self-affine network is a self-similar network, in which the ratios d_j/d_{j+1} and l_j/l_{j+1} are both substantially constant for channels of successive generations independent of their direction.

18. (NEW)   Hierarchical network according to claim 10, wherein said self-affine network is a self-similar network in which the ratios d_j/d_{j+1} and l_j/l_{j+1} are both substantially constant for channels of successive generations independent of their direction.

REMARKS

Prior to this Amendment, claims 1-13 were pending. This Amendment cancels claims 9 and 11, without prejudice. The specification and claims 1-3, 5-8, 10-12 are amended for clarity and/or to correct informalities, and new claims 14-18 are added. Entry of the amendments is deemed to be appropriate, as they add no new matter but find support in the specification as filed. Upon entry of this Amendment, claims 1-8, 10, and 12-18 will be pending.

In particular, the specification has been amended to include appropriate subtitles (e.g., "Background", "Summary of the Invention").

Instances of "and/or" throughout the claims have been deleted and the phrases they linked have been clarified. In each of independent claims 1, 4, 6, 7, and 10, as amended, minor amendments have been made to clarify the clause, "whereby each <u>channel</u> of said child generation[s] may in turn

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